

WILLIAM EAMON CARROLL et al
Application No. 10/799,793

REMARKS

Claims 18-29 and 31-38 remain before the Examiner for reconsideration.

With regard to the Response to the Restriction Requirement filed February 26, 2007, the Examiner indicated that:

Claims 1-17, 30, and 39 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected group and species, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on 3/2/2007.

Applicant's election with traverse of species of vinylamine, vinyl alcohol, and monosaccharide is acknowledged. The traversal is on the ground(s) that the species are not distinct. This is not found persuasive because applicant has not submitted evidence or identified such evidence now of record showing the species to be obvious variants or clearly admit on the record that this is the case.

The requirement is still deemed proper and is therefore made FINAL.

For the reasons set forth in the Response to Restriction Requirement filed March 2, 2007, Applicants respectfully traverse the Examiner's requirement of restriction. Applicants note that contrary to the Examiner's assertion, the Applicants did not traverse "on the ground(s) that the species are not distinct", but that examination of all of the species asserted by the Examiner would require search of essentially the same or similar art and would not place an undue burden upon the Examiner. Nonetheless, in the interest or expedient prosecution, Applicants affirm the election set forth in the Response to Restriction Requirement, and Claims 1-17, 30 and 39 are withdrawn.

In the Office Action dated April 18, 2007, the Examiner rejected Claims 18-29 and 31-38 under 35 U.S.C. 112, first paragraph, "as based on a disclosure that is not enabling." Specifically, the Examiner asserted that:

The method of causing the crosslinking reaction to proceed further is critical or essential to the practice of the invention, but not included in the claim(s) is not enabled by the disclosure. See *In re Mayhew*, 527 F.2d 1229, 188 USPQ 356 (CCPA 1976). Applicants claims require that the reaction proceeds further but does not indicate what method is used to cause this

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reaction. One of ordinary skill in the art would not be able to determine what compositions would meet this limitation without undue experimentation.

Applicants respectfully traverse the Examiner's rejection.

No critical or essential action or process of the invention is excluded from the claims of the present invention. Moreover, in light of the specification and the knowledge and skill of those of ordinary skill in the art, and contrary to the Examiner's assertion, one skilled in the art can clearly determine what compositions would meet the limitations of the claims without undue experimentation. Indeed, the claims set forth clearly and explicitly that the compositions of the present invention comprises at least one hydrophilic polymer containing at least two groups which are independently the same or different a primary amine group or a secondary amine group and at least one saccharide containing a reducible function. Further, the method(s) by which one can substantially terminate the crosslinking reaction of the present invention and subsequently cause the reaction to proceed further (after contacting the cellulosic pulp with the composition of the present invention) are clear to those skilled in the art in light of the specification and the knowledge and skill of those of ordinary skill in the art.

The presently claimed invention requires only the claimed actions of:

contacting wet cellulosic pulp with a composition comprising (i) at least one hydrophilic polymer containing at least two groups which are independently the same or different a primary amine group or a secondary amine group and at least one saccharide containing a reducible function, the hydrophilic polymer and the saccharide of the composition having been reacted in a crosslinking reaction prior to contacting the composition with the cellulosic pulp product to increase the viscosity the composition, the crosslinking reaction being substantially terminated by changing at least one reaction condition; and,

after contacting the cellulosic pulp with the composition, causing the crosslinking reaction between the hydrophilic polymer and the saccharide of the composition to proceed further by providing reaction conditions suitable to cause the reaction to proceed further.

The case of In re Mayhew cited by the Examiner is indeed instructive in the present invention, and the standard set forth therein clearly indicates that the claims of the

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present invention fully satisfy the requirements of Section 112.

In In re Mayhew, the specification of the Mayhew patent application clearly indicated that a cooling zone step was essential to the inventive process but the cooling zone step was excluded from those claims of the Mayhew application for which the United States Court of Customs and Appeals (the CCPA) affirmed rejection. Those claim rejections were designated rejections (1) and (2) by the CCPA. Unlike the case of the Mayhew application, no such essential step is excluded from the present claims. The action of causing the crosslinking reaction to proceed further, which is cited by the Examiner, is clearly set forth in the claims of the present invention. However, the Examiner asserts that the claims do not indicate what method is used to cause this reaction.

This rejection of claims of the present invention is analogous to the rejection of several of the claims of Mayhew (designated rejection (3) by the CCPA) which was reversed by the CCPA. Those claims of the Mayhew application included recitation of the "essential" zone of cooling but did not recite the temperature of the zone or the function thereof. The CCPA emphasized that the claims must be read "in light of the specification" in concluding that the selection of the temperature of cooling would be within the ability of one of ordinary skill in the art and that the claims satisfied the requirements Section 112. In re Mayhew, 527 F.2d 1229, 1233. The CCPA concluded:

Reading the claims, as they must be read, in the light of the specification, we think that the general function of the cooling zone is clear from the other recitations of the claims and that selection of the temperature of the zone would be within the ability of one of ordinary skill in the art attempting to follow the teaching of the specification.

Like the case of the above-identified claims in In re Mayhew, the claims of the present invention when read, as they must be read, in the light of the specification, fully satisfy the requirements of Section 112. In that regard, it is clear to one of ordinary skill in the art attempting to follow the teaching of the specification that reaction condition(s) can readily be controlled to both substantially terminate the crosslinking reaction of the compositions of the present invention and subsequently cause the crosslinking reaction to

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proceed further (after contacting the cellulosic pulp). For example, as clearly set forth in the specification, reaction conditions such as temperature and/or pH can be used to substantially terminate the crosslinking reaction and to subsequently cause the reaction to proceed further. For example, as set forth in claim 19, the crosslinking reaction can be substantially terminated by reducing the pH of the composition (for example, to a pH of 4 to 6 as set forth in claim 27). As set forth in claim 26, the pH can, for example, be in the range of 10 to 12 during crosslinking reaction. Applicants have amended claim 18 to even more clearly set forth that the crosslinking reaction of the compositions of the present invention is substantially terminated and subsequently caused to proceed further (after contacting the cellulosic pulp) by control/change of at least one reaction condition. The use of reaction conditions to control the kinetics of a reaction is a well known technique in the chemical arts.

The Examiner also rejected Claims 18-29 and 31-38 under 35 U.S.C. 112, second paragraph, "as being incomplete for omitting essential elements, such omission amounting to a gap between the elements. See MPEP § 2172.01." Specifically, the Examiner asserted that:

The omitted elements are: method of causing the crosslinking reaction to proceed further. Applicant's claims require that the reaction proceeds further but does not indicate what method is used to cause this reaction. One of ordinary skill in the art would not be able to determine what compositions would meet this limitation without undue experimentation.

For the reasons set forth above, Applicants respectfully traverse the Examiner's rejection.

The Examiner also rejected Claims 18-29 and 31-38 under 35 U.S.C. 103(a) "as being unpatentable over Anderson et al (6,710,175)." Specifically, the Examiner asserted that:

Anderson et al disclose a starch and polymer combination for increasing the strength of paper. The polymer includes reactive amine group (col. 6, lines 60-67) and includes polyvinylamine (col. 9, lines 20-50). Anderson further indicates that the starch and polymer can react simply by mixing (col. 5 lines 10-16) and that further reaction can take place under heated conditions prior to addition to the papermaking process (col. 14, lines 45-60 and col. 20, lines 7-20). Experiment 3 indicates that the reaction may take place at pH of 11.7 and then subsequently be reduced with HCl to 5.0. One example

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indicates that the viscosity can be 31 mPa (col. 38, lines 10-15). The pulp is subsequently dried by a Rapid-Kotchen sheet former (col. 39, lines 50-11). Though Anderson indicates many possible ways of combining the starch and polymer to arrive at the paper strengthening mixture, the specific claimed process steps are not shown.

However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to vary the method steps since Anderson discloses that many various orders of combining, heating, and pH modification may be used. See *In re Burhans*, 154 F.2d 690, 69 USPQ 330 (CCPA 1946) (selection of any order of performing process steps is prima facie obvious in the absence of new or unexpected results) and *In re Gibson*, 39 F.2d 975, 5 USPQ 230 (CCPA 1930) (Selection of any order of mixing ingredients is prima facie obvious). See MPEP 2144.04(IV)(C).

Applicants respectfully traverse the Examiner's rejection.

Initially, unlike the present invention Anderson requires the use of a starch oxidized with an oxidizing agent (for example, selected from periodate(s), hypochlorite(s), ozone, peroxide(s), hyperperoxide(s), hydrogen peroxide, persulfate(s), percarbonate(s) and mixtures thereof). See, for example, Claim 1 of Anderson. It is unnecessary to react the saccharides of the present invention with such potentially toxic compounds.

Moreover, as admitted by the Examiner, "the specific claimed process steps are not shown" in Anderson. In the presently claimed invention, a crosslinking reaction of the partially crosslinked composition of the present invention is substantially terminated prior to contact of the composition with cellulosic pulp. Subsequently, after contact with the cellulosic pulp with the composition, the crosslinking reaction is caused to proceed. To the contrary, Anderson teaches that the reaction between the oxidized starch and the amine-containing polymer thereof (for example, polyvinylamine or PVAm) is completed prior to addition of the material to paper. As set forth, for example, at col. 22, lines 23-31:

After cooking, if the system is one in which the oxidized starch (or otherwise modified starch) and the PVAm (or other polymer) were not reacted prior to production into the cooking system, the reaction to the PVAm and the starch could be allowed to proceed over a period of time typically, for example, from about five seconds to several hours, preferably with conditions chosen such that the reaction to adduct will be

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completed within time of from 10 seconds to 20 minutes, and prior to addition of the material to the paper.

Although, as asserted by the Examiner, Anderson may disclose various manners of preparing reaction components thereof and of reacting those components, the above-identified actions of the present method, which are not disclosed or suggested by Anderson, are not mere variations of any order of processing steps as asserted by the Examiner.

Further, in light of the above considerations, Anderson clearly does not disclose or suggest the use of reaction condition(s) (such as pH) to substantially terminate a crosslinking reaction between a saccharide and an amine-containing polymer and to subsequently cause a crosslinking reaction to proceed. Example 3 of Anderson, cited by the Examiner for a reaction that takes place at a pH of 11.7 and is then subsequently reduce with HCl to 5.0, for example, is merely a reaction to oxidize starch. There is no reaction of the oxidized starch with any amine-containing polymer in Example 3 of Anderson.

Still further, the disclosure of Anderson is limited to oxidized/modified starches. There is no disclosure or suggestion of the reaction of other saccharides (for example, monosaccharides or disaccharides) with a hydrophilic polymer containing at least two groups which are independently the same or different a primary amine group or a secondary amine group as claimed in the present invention (see, for example, Claims 29 and 33).

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In view of the above amendments and remarks, the Applicants respectfully requests that the Examiner, indicate the allowability of the Claims, and arrange for an official Notice of Allowance to be issued in due course.

Respectfully submitted,
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